From: Khoury, Ghassan
To: Miller, Garyg
Subject: RE: Diamond Alkali Phase I and SJRWP
Date: Thursday, March 31, 2016 3:11:08 PM

Can you send me the full code for the site to put in people +
Thank you!

From: Miller, Garyg
Sent: Thursday, March 31, 2016 2:35 PM
To: Khoury, Ghassan <Khoury.Ghassan@epa.gov>; Sanchez, Carlos <sanchez.carlos@epa.gov>
Cc: Turner, Philip <Turner.Philip@epa.gov>; Villarreal, Chris <villarreal.chris@epa.gov>; Banipal, Ben <banipal.ben@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>
Subject: RE: Diamond Alkali Phase I and SJRWP

Thanks Ghassan – this is very helpful.

Gary Miller
Remedial Project Manager
EPA Region 6 – Superfund Division (6SF-RA)
214-665-8318
miller.garyg@epa.gov

From: Khoury, Ghassan
Sent: Thursday, March 31, 2016 2:27 PM
To: Sanchez, Carlos <sanchez.carlos@epa.gov>; Miller, Garyg <Miller.Garyg@epa.gov>
Cc: Turner, Philip <Turner.Philip@epa.gov>; Villarreal, Chris <villarreal.chris@epa.gov>; Banipal, Ben <banipal.ben@epa.gov>; Rauscher, Jon <Rauscher.Jon@epa.gov>; Khoury, Ghassan <Khoury.Ghassan@epa.gov>
Subject: RE: Diamond Alkali Phase I and SJRWP

The quotes below were taken from ATSDR Tox profile 1998. I used the information from the ATSDR report to calculate the time needed to degrade the dioxin in the sediment. Hope this is helpful.

"The loss of 2,3,7,8-TCDD in contaminated soil has been studied under natural conditions in experimental plots at the Dioxin Research Facility, Times Beach, Missouri (Yanders et al. 1989). The 2,3,7,8-TCDD concentration profiles of sample cores taken at Times Beach in 1988 were virtually the same as those in cores taken in 1984. The authors concluded that the loss of 2,3,7,8-TCDD due to photolysis at Times Beach was minimal in the 4 years covered by the study (Yanders et al. 1989). Estimates of the half-life of TCDD on the soil surface range from 9 to 15 years, whereas the half-life in subsurface soil may range from 25 to 100 years (Paustenbach et al. 1992)."

"The environmental fate and transport of CDDs involve volatilization, long-range transport, wet and dry deposition, photolysis, bioaccumulation, and biodegradation (Kieatiwong et al. 1990). CDDs strongly partition to soils and sediments. Due to their low vapor pressure and low aqueous solubility and their strong sorption to particulates, CDDs are generally immobile in soils and sediments. Although most biological and nonbiological transformation processes are slow, photolysis has been shown to be relatively rapid. Photolysis is probably the most important transformation process in environmental systems into which sunlight can penetrate (Kieatiwong et al. 1990). Estimates of the half-life of 2,3,7,8-TCDD on the soil surface range from 9 to 15 years, whereas the half-life in subsurface soil may range from 25 to 100 years (Paustenbach et al. 1992). CDDs have been shown to bioaccumulate in both aquatic and terrestrial biota. CDDs have a high affinity for lipids and, thus, will bioaccumulate to a greater extent in organisms with a high fat content."

To answer the question raised in the email below that is: Find the time needed to degrade the dioxin in the sediment from an initial current value of 40,000 ppt to the cleanup level of 220 ppt. The half-life for dioxin

in the subsurface of 100 years (from the quote above) is assumed for sediment. The sediment is expected to be less exposed to photolysis and the higher chlorinated compounds are expected to be found

in the sediment which are more resistant to degradation than the lower chlorinated compounds. Therefore the upper end of the range (from 25 years to 100 years) was used.

We use the exponential degradation equation as follows:

$$C(t) = C(0) * e^{kt}$$

Where : C(t) = is the concentration after time t = 220 ppt
C(0)= is the concentration at time zero. = 40,000 ppt
k= ln (½)/ T = 0.00693
T = half-life k= 0.693/100 years = 0.00693

t = elapsed time which is the unknown

$$\ln (220/40{,}000) = 0.00693 * t$$

$$t = 5.2/0.00693 = 750 \text{ years.}$$

Therefore it will take about 1) 750 years for dioxin in the sediment to reduce from 40,000 ppt to the recreation cleanup level of 220 ppt

2) 494 years for dioxin in the sediment to reduce from 40,000 ppt to the Industrial cleanup level of 1,300 ppt.

This is just a rough estimate. If you have further questions or need clarification please email

me or let's discuss.

From: Sanchez, Carlos
Sent: Wednesday, March 30, 2016 12:05 PM
To: Miller, Garyg <Miller.Garyg@epa.gov>
Cc: Turner, Philip <Turner.Philip@epa.gov>; Khoury, Ghassan <Khoury.Ghassan@epa.gov>
Subject: RE: Diamond Alkali Phase I and SJRWP

Gary,
I do not believe that we have estimate or have this information. Check with the risk assessors.
Thanks CAS

From: Scott Jones [mailto:sjones@galvbay.org]
Sent: Wednesday, March 30, 2016 12:01 PM
To: Miller, Garyg
Cc: Walters, Donn; 'Jennifer Ronk'; 'Bob Stokes'; Sanchez, Carlos; Coleman, Sam; Gray, David; Foster, Anne; Leos, Valmichael
Subject: RE: Diamond Alkali Phase I and SJRWP

Thank you, Gary! I really appreciate it.

Would it be possible for you to tell me more specifically how long it would take for the dioxin in the wastes in this pit (perhaps using either the highest concentration you found to date or perhaps the median value or average, even if very rough) to breakdown to the EPA preliminary action level of 220 ng/kg in sediment (recreational use) and 1300 ng/kg in sediment (industrial/commercial use)? For each of those scenarios, is there a half-life calculation that could be used to give us a ballpark range of time we are talking about?

Scott

Scott A. Jones
Director of Advocacy

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Protecting the natural resources of Galveston Bay since 1987

From: Miller, Garyg [mailto:Miller.Garyg@epa.gov]
Sent: Wednesday, March 30, 2016 11:27 AM

To: sjones@galvbay.org
Cc: Walters, Donn <walters.donn@epa.gov>; Jennifer Ronk <jronk@harcresearch.org>; Bob Stokes <bstokes@galvbay.org>; Sanchez, Carlos <sanchez.carlos@epa.gov>; Coleman, Sam <Coleman.Sam@epa.gov>; Gray, David <gray.david@epa.gov>; Walters, Donn <walters.donn@epa.gov>; Foster, Anne <Foster.Anne@epa.gov>
Subject: FW: Diamond Alkali Phase I and SJRWP

Scott,

Thanks you for your comments. The EPA will consider all of these issues as it works towards a proposed plan for a final remedy for the site.

Regarding dioxin breakdown, dioxin is extremely persistent and break down very slowly. Here are some links regarding dioxin:

https://www.epa.gov/dioxin/learn-about-dioxin

https://www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response

http://www.atsdr.cdc.gov/PHS/PHS.asp?id=361&tid=63#bookmark02

https://www.niehs.nih.gov/health/materials/dioxins_new_508.pdf

Regards,

Gary Miller
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miller.garyg@epa.gov

From: Scott Jones [mailto:sjones@galvbay.org]
Sent: Tuesday, March 29, 2016 4:42 PM
To: Walters, Donn <walters.donn@epa.gov>; Miller, Garyg <Miller.Garyg@epa.gov>
Cc: Jennifer Ronk <jronk@harcresearch.org>; Bob Stokes <bstokes@galvbay.org>; Sanchez, Carlos <sanchez.carlos@epa.gov>; Coleman, Sam <Coleman.Sam@epa.gov>; Gray, David <gray.david@epa.gov>
Subject: RE: Diamond Alkali Phase I and SJRWP

Hi Donn and Gary-
Yesterday, I spoke with Elizabeth Butler, the EPA Diamond Alkali site project manager, and Sophia Rini, the EPA CIC. They both deem that project a success, as does Debbie Mans, the executive director of NY/NJ Baykeeper. I hope that the EPA Region 6 team will talk to Region 2 about the success of this site removal, as well as look at other examples of successful removal actions at other

locations throughout the country and then give the San Jacinto River/Galveston Bay and its users the same level of protection by removing this source of dioxin once and for all. It's just too risky to try to contain it.

GBF is calling for a removal action, as we noted in our June 2014 letter to Gary and the NRRB after having looked at the scientific evidence, examples of cleanups from throughout the country and the actual events on the ground (made all the more urgent by the happenings in December and this month). Here are our many reasons:

1. the unsuitability of the site for in situ subaqueous containment, as it is not a low energy environment in a protected harbor or low flow stream (it is anything but with our floods, hurricanes and barge traffic…);
2. the inability of humans to perform a dependable risk analysis over such a long period of time that the dioxins will remain at dangerous levels and that a man-made cap must last under natural conditions, let alone man-made acceleration of relative sea level rise and climate change (I hear a 500 year or more figure from Gary; as well as the Region 2 staff when I asked them how long they thought it would last);
3. the PRP's lack of a legitimate full removal option with common sense BMPs in their draft FS/cleanup alternatives white paper and the incomplete risk analysis of the same in which they used open water dredging and the site being uncovered for 2 years to back up their argument for permanent containment, when there are examples of phased removal out there right now, which makes one question their transparency and motives;
4. a temporary armored cap that was purported by the PRP's to be designed to handle a 100-year flood when it could not handle a 10-year flood, which makes one question the PRP's expertise to model and design a permanent cap;
5. unlined portions of the cap and therefore no true assurance that the cap has removed the pathway to the food chain, which makes one question the PRP's science and judgement when David Keith of Anchor writes in a July 2014 Houston Chronicle op ed that the temporary cap has eliminated all pathways, unequivocally.
6. a mystery hole in the unlined NW quadrant for which we still don't know the cause nor how long it has been there, which makes one question the PRP's ability to adequately construct a cap or monitor it;
7. a majority of the cap that has still not had an underwater inspection, which also makes one question the ability of the PRP's to adequately monitor a cap

I could go on about the deficiencies in the PRP's work to date and the related limitations of the Corps' 3rd party review, but I think that is enough for now.

Bottom line: The science, evidence to date, and inability to truly measure the risk involved overwhelmingly supports the EPA's call for a removal action: it is much more risky to try to contain the dioxin than to remove it. Man-made objects fail, especially over such a long time frame. Look at the examples of failed bridges and dams. We think it is just a matter of time before a cap, enhanced or not, will fail in this location. We are pretty much talking forever, no? Will these companies even be around to try to make it right when that happens?

We also think that containment will ultimately be costlier than removal. What will the cost be to the

Galveston Bay recreational and commercial fisheries and related businesses when the cap fails? What will the cost be to the fishermens' and crabbers' health? Has that been factored into the risk analysis?

Thanks-
Scott

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Protecting the natural resources of Galveston Bay since 1987

From: Walters, Donn [mailto:walters.donn@epa.gov]
Sent: Tuesday, March 29, 2016 2:26 PM
To: sjones@galvbay.org
Subject: RE: Diamond Alkali Phase I and SJRWP

Scott, I would suggest checking the Region 2 website for further information.

From: sjones@galvbay.org [mailto:sjones@galvbay.org]
Sent: Monday, March 28, 2016 10:13 AM
To: Walters, Donn <walters.donn@epa.gov>; sjones@galvbay.org
Cc: Miller, Garyg <Miller.Garyg@epa.gov>
Subject: Re: Diamond Alkali Phase I and SJRWP

Thanks, Donn.

But can you tell me if Diamond Alkali Phase I removal has been deemed successful by EPA? Or can you provide me the name of an EPA staffer with whom I could speak to get that answer?

Scott

> -----Original Message-----
> **From:** Walters, Donn [mailto:walters.donn@epa.gov]
> **Sent:** Monday, March 28, 2016 09:51 AM
> **To:** sjones@galvbay.org
> **Cc:** 'Miller, Garyg'
> **Subject:** RE: Diamond Alkali Phase I and SJRWP
>
> Thanks Scott for input. I always remind the public that one cannot accurately compare different

Superfund sites. As I recall this is a very different waterway parameter and much more urbanized and industry near.

From: sjones@galvbay.org [mailto:sjones@galvbay.org]
Sent: Saturday, March 26, 2016 12:59 PM
To: Miller, Garyg <Miller.Garyg@epa.gov>; Walters, Donn <walters.donn@epa.gov>
Cc: sjones@galvbay.org; bstokes@galvbay.org; jronk@harc.edu
Subject: Diamond Alkali Phase I and SJRWP

Hello Gary and Donn-
I have a couple of questions that I hope you can answer:

1. Can you tell me if Diamond Alkali Phase I removal of 40,000 CY of dioxin-laden material up on the Passaic in Newark, NJ has succeeeded in protecting human health and the environment? I see that Phase II will remove another 160,000 CY. Seems to have a lot of similarities to SJRWP... Here is a video with EPA Region 2's Walter Mugdan explaining the cleanup: https://www.youtube.com/watch?v=cDnWa8v8xpc
2. Gary - can you confirm what you told me on March 11th, that the dioxin under this cap will have no appreciable breakdown? I was wondering if the 500-year risk calculation figure in the Corps 3rd party review is even enough time for these toxins to breakdown? So, if I say that this stuff could last "forever", would I would be correct?

And I have some thoughts about protecting the the bay and some additional questions:

To me, going 500 years into the future, to the Year 2516, is already "forever." That is at least 20 more generations of bay fishermen and crabbers that need a man-made cap to work to keep them safe... In a location that is not a "low energy environment" in a "protected harbor" or "low flow stream" as EPA guidance recommends for in-situ subaqueous containment.

Or go back 500 years to the Year 1516. Would a person standing on the banks of the San Jacinto River in 1516 know what the river would like like in the Year 2016? For that matter, would a person standing on the banks of the San Jacitno in 1965 know what the river would look like in 1975, 1985, 1995, 2015 or today? The answer to those two questions is a resounding "no."

What other changes will mankind induce on this river, and a potential underwater permanent toxic waste containment site, beyond just the natural changes that will surely occur? Rivers will change course, land will sink, the sea and estuarine rivers will rise, and the climate will change. Many, if not all, of those things have already happened in this reach of the San Jacinto since the day that MIMC decided to open up a toxic waste site on the edge of a major river for business.

When the PRPs designed and built the temporary cap, and said it would eliminate all exposure pathways by its very nature and that it would withstand a 100-year flood, I will take them at their word that they believed that to be the case. But we can see that it has failed to meet those standards in it's short 4.5 year lifetime in the form of holes/gaps/caps/erosion. Especially troubling is the hole in the NW quadrant where there

is no liner to protect the biota/food web from the 43,700 ppt concentration sediments/waste. I am sure PRPs believed in the temporary cap integrity as much as those who designed and built the I-35 bridge over the Mississippi River in Minneapolis, or those who have built dams that have failed, or those who designed the Titanic and said it was unsinkable. That is the nature of human endeavors and engineering; we are not humble enough to know our engineering limitations.

So, can the PRPs guarantee that a permanent cap can be engineered to protect us during a 500-year flood or 100-year hurricane over a 500 year time frame? What will the risk of containment in this location be over 500 years? Can we even begin to run a reliable risk analysis for that long of a period?

What we do know is that if the wastes are removed from the SJRWP in a responsible manner, then risks to fishermen and crabbers from its dioxin can begin to go to zero as the dioxin that was released from the mid-60s and onward starts to work itself out of the sediments and food chain. As with the pesticide (chlordane, DDT, etc.) advisory that was recently rescinded for these waters, perhaps we could have another feel good story and dioxin can be eventually removed as a contaminant of concern. That only happened because the sources of those pesticides were removed through bans; none of it was contained under subaqueous caps where it could remain a threat... This dioxin will remain a true threat until it is removed once and for all. If it sits under a cap, we are asking for trouble in the future.

Thanks-
Scott